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INTEGRATING INSTITUTIONAL AND INDIVIDUAL INFORMATION SYSTEMS ASSESSMENT THROUGH THE CENTER FOR COMPUTING EDUCATION RESEARCH

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ABSTRACT

The Institute for Certification of Computing Professionals Education Foundation (ICCP/EF) and the Center for Computing Education Research (CCER) have united to form a coalition of universities and colleges interested in information systems (IS) exit skills assessment. In 2003, the coalition successfully developed an outcome-based assessment exam reflecting the learning units (LUs) defined in the IS 2002 Model Curriculum and the entry-level requirements accepted for the ICCP's information systems analyst (ISA) certification. Since 2003, versions of this exam have been administered to over 2,700 participants in IS-related degree programs at 45 institutions, and more than 300 qualified individuals have been ISA-certified. The assessment exam, i.e. exit exam, is at the center of a series of activities and tools forming an intersection of IS institutional and individual assessment. This paper is a call to action for participation in a growing movement aimed at focused improvement of IS courses and curricula, and

*recognition of student achievement through professional certification. Future directions point to an emerging community of practice centered on outcome-based information systems **direct** assessment, and to the application of the IS exit exam to accreditation.*

I. Introduction

The IS Exit Exam, based on the IS 2002 Model Curriculum [Gorgone et al., 2002], has been administered to more than 2,700 students in IS-related programs at 45 participating institutions since 2003 and has become **an intersection and link (i.e. a nexus)** for individual and programmatic information systems assessment. The nature of this nexus is that the IS exit exam serves as a common instrument for integrating two related goals: (1) to provide institutional feedback on programmatic preparation of graduates consistent with the IS 2002 Model Curriculum – facilitated by summarizing and analyzing individual performance data on the exit exam; and (2) assessment of individual student performance for the purpose of credentialing entry level professionals based on their knowledge of information technology concepts and skills commonly achieved in IS-related programs and required by various entry level positions.

To accomplish the first of the above goals, the Center for Computing Education Research (CCER) was formed to provide the IS Exit Exam and related programmatic evaluation services to institutions. To accomplish the second goal, the Institute for Certification of Computing Professionals (ICCP) created a new vendor-neutral professional certification titled “Information Systems Analyst” (ISA) based on successful IS exit exam performance and completion of an IS-related degree.

The purpose of this paper is to describe the IS Exit Exam as an IS assessment instrument and to encourage participation in a growing IS assessment movement. The remainder of this paper tracks developments in the dual areas of institutional and individual IS assessment, provides some detailed discussion of the design, delivery and purpose of the IS Exit Exam, argues for the IS Exit Exam as an institutional-individual assessment nexus, and calls for participation of interested IS faculty in joining a community of practice in IS assessment.

II. Institutional IS Assessment

Although IS 2002 has been a recognized and well-promoted standard for IS education, the use of the model curriculum’s detailed learning units (LUs) that form the basis for an outcomes-based assessment process is now starting to gain momentum. Intended for a university-level four year program of instruction in information systems, the IS 2002 revision is the latest update to a sequence of curriculum recommendations which were first considered in 1972. Formal curriculum recommendations were published by the Data Processing Management Association (DPMA, now the AITP) in 1981, 1986, and 1991, and the Association for Computing Machinery (ACM) in 1981. Both IS’97 and IS2002 represented updates generated cooperatively by the ACM, AIS, and AITP. More than 150 LUs **of the IS2002 Model Curriculum** describe behaviorally stated cognitive goals and objectives of IS education based on the Bloom [1956] taxonomy. Although no specific assessment process is described in IS2002, these LUs enable development of specific mechanisms for assessment

IS Educators and ICCP—A Coalition Forms

The process of evaluating, assessing and accrediting IS-related educational programs has been a topic of discussion for some decades. In 2001 a panel discussion at the annual Information Systems Education Conference (ISECON) [McKell, 2001] focused on this topic by addressing the question of whether existing ICCP certifications could be used as a complement to program accreditation by extrapolating compliance with the IS Model Curriculum guidelines from individual performance scores on ICCP exams. This was interpreted to mean “could ICCP exams be used to assess the preparation of undergraduate students relative to the objectives of the IS Model Curriculum?” At that time the latest version was the IS’97 Model Curriculum [Davis et al., 1997]. Participants on the panel included one of the authors of the Model Curriculum and a member of the ICCP Certification Council. From that discussion (and a subsequent ICCP Certification Council point by point mapping of the **ICCP Core** exam to the IS 2002 model curriculum) emerged the general conclusion that existing ICCP exams were not calibrated for measuring compliance with the IS Model Curriculum.

In late 2002, discussions between IS educators at ISECON and the ICCP concluded that a professional exam could accomplish the goal of adequately assessing student performance relative to the model curriculum. This exam would include

scenario-type multiple choice questions mapped specifically to the exit-level LUs described in the model curriculum. At the same time, the exam would follow guidelines set by the ICCP for practical, professional certification.

The first version of the IS Exit Exam was launched with the dual purposes of assessing the readiness of IS majors to enter the job market and to improve IS courses and curricula [Landry et al., 2003]. A coalition of IS educators representing 17 institutions met in a February 2003 workshop, co-sponsored by the University of South Alabama, Grand Valley State University, and the ICCP and held in Mobile, Alabama. The development process combined test development practices of the ICCP with software developed by faculty at the University of South Alabama, and the IS 2002 model curriculum as the basis for exam content. Teams of educators were organized based on individual specialties, and were assigned to develop a given minimum number of questions in the specified topical area based on the weighting for that area in the Model Curriculum. All questions were in the multiple choice format with 4 choices for answers (3 distracters and 1 correct answer). The goal was to produce a 100 question exam which could be delivered in an online format, that would measure student performance near the time of graduation from a relevant undergraduate degree program patterned after the IS 2002 Model Curriculum.

The workshop was successful in creating the specified IS Exit Exam. This exam was beta tested in two primary venues resulting in useable data points from over 500 students. The beta testing venues included students attending the AITP National Collegiate Conference held at Purdue University, West LaFayette, Indiana in March, 2003 – approximately 175 of the 500+ student attendees took the exam. Additionally, the exam was administered to graduating students at the 17 coalition schools who had participated in the exam development workshop. A total of 587 takers averaged a score of 52 on the 100-item, 90-minute exam.

The Center For Computing Education Research — Expanding Institutional Assessment

A primary objective of the IS Exit Exam is to create an instrument useful in assessing the compliance of relevant undergraduate educational programs as measured against the IS 2002 Model Curriculum. While analysis of data derived from student performance on the IS Exit Exam is a vital key component in that assessment, there are other components which will be useful, including mapping an institution's IS program to the LUs of the Model Curriculum. With such a mapping in place, IS Exit Exam data can be used to pinpoint areas of strength and weakness in an institution's degree program. A cursory thought regarding the administration of the assessment, analysis and reporting functions immediately suggested the need for an organization to serve as the nexus and supplier of these services.

In order to meet the above need, the Center for Computing Education Research (CCER) was organized within the ICCP Education Foundation (ICCP/EF) [ICCP EF/CCER, 2004]. The ICCP/EF was formed approximately two decades ago, and is uniquely positioned to host the CCER. The ICCP/EF is sympathetic to the aims of the ICCP but focuses on education related issues and operates at an arm's length legally as a totally separate 501c3 entity, with a board of directors separate and distinct from the ICCP operations. As such the ICCP Education Foundation is well positioned to seek external grants and research funding in support of educational objectives, and to host the CCER which will administer a package of institutional assessment services based on the IS Exit Exam.

Since the initial use of the exit exam, the CCER has expanded its institutional assessment services to include more processes, tools, and accessible information. Current uses of the assessment tools include the improvement of courses and curricula and professional certification. For example, the exit assessment tools have been used to assess the impact of a proposed curriculum change [Landry et al., 2004] by comparing the LUs covered by a course being considered as a replacement for another course. A process for mapping one's IS curriculum to the IS 2002 model curriculum has been established [Daigle et al., 2004], and a means for course-level assessment and improvement has been described [Landry et al., 2005]. By aligning the IS Model Curriculum with standards set by the ICCP [McKell et al., 2004], the new Information Systems Analyst (ISA) certification simultaneously provides students making a passing score on the exit exam with credentials from two respected bodies [McKell et al., 2005]. As future uses of the assessment mechanisms emerge and get refined, a more mature, continuous improvement process is possible [White et al., 2003].

The CCER contracts with institutions, not with individuals, to provide the assessment services and reports described above. Currently, institutional costs are set at \$2000 per year. The ICCP offers a \$70 credit to the CCER on behalf of the institution for each student who registers for the ISA certificate. Institutions can direct inquiries to the ICCP/EF .or directly to the CCER (see <http://www.ISeducation.org> for contact information).

III. Individual IS Assessment

“ISA” – A New Certification Based On The IS Exit Exam

With a new IS Exit Exam in place, a reciprocal question was posed to appropriate CCER and ICCP officials. In reverse contrast to the question about using ICCP exams for Model Curriculum assessment, the new IS Exit Exam begs the question: “Could the new IS Exit Exam be used as the basis for a relevant credential?” Representatives from CCER and the coalition schools outlined the requirements for a new certification and made the proposition to the ICCP. This proposal was reviewed favorably and approved by the ICCP Certification Council. A contract has been signed between the ICCP/EF and the ICCP whereby the ICCP/EF will pass relevant individual exam response data to the ICCP which in turn is now prepared to issue a new professional credential titled “Information Systems Analyst” (designated by the acronym, “ISA”).

The qualification requirements for the Information Systems Analyst (ISA) certification are:

1. Receive a degree in a CS/IS/IT or related area within one year of passing the ISA exam.
2. Ascribe to the ICCP code of ethics.
3. Participate in a recertification program.
4. Pass the IS Exit Exam at an acceptable level. Those who pass at the 50%-69% level would be designated as ISA-Practitioner level. Those who pass at the 70% or higher level would be designated as ISA-Mastery level.

Notably absent in the above criteria is an experience requirement. The ISA certification is specifically intended as an entry level credential and, therefore, is issued irrespective of experience. In the ICCP scheme of certifications, the ISA would generally be considered at a higher level than the Associate Computing Professional (ACP) credential, but not as high as the Certified Computing Professional (CCP), which does have an experience requirement and requires a higher level of performance on both general and specialization exams, and acknowledges credit for academic degrees. (See Table-1 for a description of ICCP professional certifications.) A normal career path would very likely involve an ISA recipient later qualifying for the CCP certification after several years of relevant experience. In either event, professionalism strongly suggests that holders of a professional credential should maintain their competency over time in order to retain their certification. This requires enrollment in a re-certification program which promotes procedures for professionals to confirm their ongoing competency. These procedures may include on-going educational experiences such as formal coursework or technical seminars and/or by passing additional certification exams. CPA’s and Professional Engineers require this for their credential; the information systems profession is even more dynamic and should require no less. To date, several hundred individuals have successfully completed and passed the IS Exit Exam and have qualified for ISA Certification.

Under guidance of a governing board the ICCP has adapted and expanded the initial DPMA exam to an integrated set of exams forming the basis for credentialing individuals to the current industry certifications as shown in Table 1. The ICCP certifications have been relatively unique in the profession because they are vendor neutral, bridging a range of knowledge from specific technical skills to strategic level technology management and problem solving abilities. The specific exams and certification requirements have been rigorously managed by a certification council, with ongoing review and updating to retain currency and relevance. Other vendor-neutral certifications differ from the ICCP credentials in the following ways: 1) The Certified Information Technology Professional (CITP) is an add-on credential which requires an individual first be a CPA; it is also possible to receive the CITP on the basis of experience without an exam or education requirement. 2) The A+ certification is oriented towards basic hardware and software skills – not professional systems development. 3) The IC3 certificate is oriented towards basic computer end-user skills – not professional systems development. In contrast to the three above designations, ICCP credentials are oriented to a much higher (strategic) level of professional capability as demonstrated by a combination of experience, education and examination.

IV. IS Exit Exam Details

After a successful beta test, the IS Exit Exam underwent some revisions to make it more suitable for its dual assessment purposes. It was deemed important for the exam to sample a comprehensive set of LUs and skills for institution and individual assessment, so the number of items was increased to the current 258. The total number of items reflects the minimum number of items to achieve a goal of four items per LU covered. Each semester a few items are added and replaced, as items undergo review and modification in accordance with good test item development practices. Two sample items are included in Figure-1.

Table 1. ICCP Certifications

Certification	Acronym	Description
Certified Computing Professional	CCP	ICCP flagship certification requiring experience and passing 3-4 exams.
Associate Computing Professional	ACP	Entry level certification based on two exams; no experience required
Certified Data Management Professional	CDMP	Practitioner and Mastery levels; offered under sponsorship with the Data Management Association (DAMA)
Certified Business Intelligence Professional	CBIP	Practitioner and Mastery levels; offered under sponsorship with The Data Warehousing Institute (TDWI)
Information Systems Analyst	ISA	Entry level certification based on the IS Exit Exam and receiving a related degree

The degree of the relationship between the COURSE and STUDENT entities in an entity-relationship (ER) model is many-to-many (M:N). This M:N relationship is implemented by

- ☐ making the primary key of the STUDENT table a foreign key in the COURSE table.
- ☐ making the primary key of the COURSE table a foreign key in the STUDENT table.
- ☒ placing the primary keys of both the STUDENT and COURSE tables in a third table.
- ☐ combining the COURSE and STUDENT tables into a single table.

Telemarketing Inc. is redesigning their call center data entry module. The layout of a screen should be MOST compatible with

- ☐ the physical design of the database
- ☒ the user's view of the data
- ☐ the logical design of the database
- ☐ the way the data will be stored using SQL

Figure 1. Sample IS Exit Exam Questions

Time allocation for the IS Exit Exam was given careful consideration. Assessment professionals advised that for an exam of this type at the college level there should be an allowance of approximately 40 seconds per question. A quick calculation shows that the 258 question exam should, therefore, be allocated 172 minutes. For convenience and administrative purposes this has been rounded to 3 hours (180 minutes; i.e. 42 seconds per question).

As noted above, the IS Exit Exam is allocated 3 hours (180) minutes. Other ICCP exams are either 90 minutes (for the regular ICCP Core exam and various specialization exams) or 60 minutes (for language exams). While the ISA requires only the IS Exit Exam (3 hours), other ICCP certifications require the candidate to pass several exams – a minimum of two exams for the ACP (the regular ICCP Core and a language exam) for a total allowed exam time of 150 minutes - and a minimum of 3 exams for the CCP (the regular ICCP Core and two specialization exams) for a total allowed exam time of 270 minutes. The increased length of the IS Exit Exam, reflective of the breadth of IS content coverage, suggests that the ISA is a more rigorous credential than the ACP, but less demanding than the CCP.

<p style="text-align: center;">Center for Computing Education Research A Division of the Institute for Certification of Computing Professionals Education Foundation</p> <p style="text-align: center;">Exam Summary State University IS2002 Exit Exam</p>							Page 1 of 1
<u>Summary Group</u>	<u>No. of Takers</u>	<u>Avg</u>	<u>No. of undergrad takers</u>	<u>Undergrad avg</u>	<u>No. of grad</u>	<u>Grad avg</u>	
All institutions	570	48.6	505	48.3	65	50.8	
Business institutions	490	48.4	454	48.2	36	51.7	
State University	85	55.8	84	55.8	1	52.7	

Figure 2. Exam Summary Report

Student performance data is analyzed to produce reports for each institution showing how well the institution is meeting model curriculum objectives in the areas of specific LUs. The reports also show aggregate performance measures of an institution's students relative to the whole population. Figures 2 and 3 show two example reports.

Exam administration procedures follow rigorous security guidelines, including administration in secure, controlled conditions. The students are required to be physically present in a room. They have to create an account and provide identification, and their identities and enrollment at the school have to be verified in software by an approved faculty member. Students log in with a password-protected account, and are allowed to sign up for the exam session unless they had already taken it in the past 30 days or were scheduled for another session. The proctors maintain control over the room, **observe** student behaviors, type in a 3-character password to start the exam, and **follow** other documented, CCER procedures to ensure a secure exam that protects the test items and attempts to prevent cheating. Although the content of the exam is identical for all students, the order of the items is randomized to reduce the possibility of cheating.

The proctors stand by in case of problems. One problem may occur when a student loses their place in the browser, in which case they can be logged in again and can resume without loss of responses or time. Sometimes, there are remedies for adjusting local computer settings that cause problems with display formatting and readability.

V. IS Exit Exam As A Nexus

The new IS Exit Exam has been designed to meet two complementary goals. First, it is used to provide data relevant to assessing educational programs and curricula in comparison to the IS 2002 Model Curriculum. Second, this same exam also serves as the primary individual skill and knowledge evaluation tool used to assess the qualification of IS graduates for receiving the Information System Analyst (ISA) credential. Consequently, the IS Exit Exam successfully integrates educational curriculum objectives with professional certification in a way rarely achieved in any academic and industry cooperative effort.

The vendor-neutral ISA credential provides a mechanism for validating qualifications of IS program graduates seeking entry level employment. Exam items are based on the widely recognized IS2002 Model Curriculum, providing exit-level credibility from an IS education standpoint. Its professional legitimacy is based on its recognition by the ICCP, a professional certifying agency with a managing board of directors comprised of representatives from a wide spectrum of professional societies. The professional component of certification also includes an explicit adoption of the industry Code of Ethics fostered by the ICCP.

<p style="text-align: center;">Center for Computing Education Research A Division of the Institute for Certification of Computing Professionals Education Foundation Model Curriculum Course Learning Unit Analysis State University IS2002 Exit Exam</p>					
				Percent Correct National	Local
Course -	7	Analysis and Logical Design		54	48
	LU Title	LU Goal			
72	- IS Analysis and Design Tasks	to present necessary concepts to provide the skills necessary to do the analysis, modeling, and definition of information systems problems		63	58
75	- IS Design and Implementation	to show how to develop a logical design, and develop and analyze alternatives involving implementation using packages, tailoring of packages, constructing software, or CASE tools		52	45
81	- IS Database Applications Development	to develop application skills for implementing databases and applications by operating and testing these databases		54	65
84	- Systems and Quality Metrics/Assessment	to develop quality metrics for assessment of customer satisfaction at all phases of the life cycle		54	51
Course -	8	Physical Design and Implementation with DBMS		47	50
	LU Title	LU Goal			
117	- Personal, Presentation	to show how to present a system design, test plan, implementation plan, and evaluation, in written and oral form		39	41
88	- IS Data Modeling	to develop skill with data modeling which describe databases		55	59
90	- IS Database and IS Implementation	to develop skill in application of database systems development and retrieval facilities needed to facilitate		46	60
Course -	10	Project Management and Practice		50	48
	LU Title	LU Goal			
105	- IS Development, Project Planning	to ensure skills needed to design a project development and implementation plan		39	38
108	- IS Development, Project Management	to select the proper project management tools and demonstrate their use		38	50

Figure 3. Learning Unit Report

Building on the work of major professional societies in computer-related areas, the new Center for Computing Education Research (CCER) was organized to provide a package of institutional IS Program assessment services. The main instrument used to support these services is a new IS Exit Exam – an individual outcome assessment exam mapped to the IS 2002 Model Curriculum. These assessment results may be useful both for internal program development and for external accreditations. The exam also supports the individual ISA certification offered through the ICCP. Institutions offering undergraduate IS-related baccalaureate degrees may obtain further information on program assessment from the Center for Computing

Education Research [ICCP EF/CCER, 2004]. Information on the ISA certification can be obtained from the Institute for Certification of Computing Professionals [ICCP, 2006].

Perhaps a relevant question is: “Should an IS student be interested in the IS Exit Exam and the related ISA certification?” First, it should be noted that under current procedures the IS Exit Exam is administered by institutions to gather program data for curriculum and program evaluation. Most institutions administer the exam as part of the curriculum – not as an optional add-on. In fact some schools include it as a graded component in a capstone course. Second, most students should welcome a credential certifying their accomplishments beyond the degree. Third, one would hope(!) that all skilled professionals would acknowledge value in a solid professional credential based on a widely accepted model curriculum and its related learning objectives; such a credential elevates the professionalism in our industry.

VI. A Call To Action

The globalization initiatives of outsourcing and off-shoring introduce new issues with respect to the assessment of professional qualifications. With the emergence of educational standards in the form of the IS2002 Model Curriculum and Professional Standards, in the form of the IS Exit Exam and the ISA Certification, we are calling on colleagues worldwide to participate in the CCER Institutional Assessment Program and promote the related entry level vendor-neutral credential. It is only with widespread support that standards become meaningful to the profession at large and in the world’s economic and social fabric. We further encourage institutions to support efforts to upgrade and maintain the assessment instruments and processes and to use the collective results for program improvements. There are multiple ways that IS Institutional Programs can participate, including:

1. Join the CCER to administer the IS Exit Exam.
2. Use the IS Exit Exam results as a factor in planning adjustments and enhancements to IS-related curriculums.
3. Support qualified professors to participate in IS Exit Exam maintenance and update.
4. Promote the ISA Certification to students graduating from IS-related programs.
5. Promote other experience-based credentials as a normal professional career path.
6. Promote on-going recertification as an individual standard for maintaining professional qualifications.

VII. Future Directions

A major future direction for IS assessment is for the current CCER-initiated collaboration of IS institutions to evolve into an IS assessment Community of Practice (CoP) [Pardue et al., 2006]. A CoP can be defined as an informal group of like-minded individuals who share a passion for a common goal or enterprise. A key supposition of a CoP is that knowledge acquisition and creation is a social activity. The benefits of a CoP include “faster answers to questions, reduced development time, improved quality of decisions, a forum for benchmarking performance, better forecasting and with participation in a CoP comes the ability to take advantage of emerging trends, increased confidence, meaningful participation, a sense of belonging, and having fun with like-minded colleagues “ [Pardue et al., 2006]. The CCER would facilitate an IS assessment CoP by articulating a compelling business case for a CoP, providing leadership and vision, working with members to map core knowledge (IS model curriculum) into assessment needs, facilitating knowledge sharing and the creation of knowledge networks through human interaction and information systems, facilitating the development of shared success metrics, and providing a mechanism for recognition of participant contributions and success.

A second major future direction for IS assessment is driven by the broad and growing interest in direct assessment of learning objectives at all levels of the educational curriculum. It may be argued that the IS Exit Exam is ideally positioned to make a significant contribution to this effort and to various related accreditations (e.g. AACSB, ABET).

Acknowledgement

The success of IS assessment efforts results from the support of deans and faculty participants at numerous institutions, and the ICCP Certification Council, who all contributed in various roles.

List Of References

- Bloom, B. S. (ed.) (1956) *The Taxonomy of Educational Objectives: Classification of Educational Goals. Handbook 1: The Cognitive Domain*. New York, NY: McKay Press.
- Daigle, R. J., H. E. Longenecker, Jr., J. P. Landry, and J. H. Pardue (2004) "Using the IS 2002 Model Curriculum for Mapping an IS Curriculum," *Information Systems Education Journal*, January 27, 2004, (2)1, URL: <http://isedj.org/2/1/>.
- Davis, G. B., J. T. Gorgone, J. D. Cougar, D. L. Feinstein, H. E. Longenecker Jr. (1997) "IS '97 Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems," ACM, New York, NY and AITP, Park Ridge, IL .
- Gorgone, J. T., G. B. Davis, J. S. Valacich, H. Topi, D. L. Feinstein, H. E. Longenecker Jr. (2002) "IS 2002 Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems," ACM, New York, NY, AIS, and AITP (formerly DPMA), Park Ridge, IL.
- ICCP, Institute for Certification of Computing Professionals (ICCP), 2350 E. Devon Ave., Suite 115, Des Plaines, IL 60018-4610 USA, phone 800-843-8227.
- ICCP EF/CCER, 2004, ICCP Education Foundation/Center for Computing Education Research, PMB #226 310 Busse Highway, Park Ridge, IL 60068-3251.
- Landry, J., H. Pardue, H. Longenecker, J. Reynolds, L. McKell, and B. White (2005) "Using the IS Model Curriculum and CCER Exit Assessment Tools for Course-Level Assessment," In *The Proceedings of ISECON 2005*, (22), Columbus OH.
- Landry, J. P., J. H. Pardue, R. J. Daigle and H. E. Longenecker, Jr. (2004) "Using IS2002 to Assess the Impact of a Proposed Curriculum Change," *Americas Conference on Information Systems (AMCIS 2004)*, August 2004, New York, NY.
- Landry, J. P., J. H. Reynolds, and H. E. Longenecker, Jr. (2003) "Assessing Readiness of IS Majors to Enter the Job Market: An IS Competency Exam Based on the Model Curriculum," *Americas Conference on Information Systems (AMCIS 2003)*, August 2003, Tampa, FL
- McKell, L. J., J. H. Reynolds, H. E. Longenecker, Jr., J. P. Landry, and J. H. Pardue (2005) "Information Systems Analyst (ISA): A Professional Certification Based on the IS 2002 Model Curriculum," *Review of Business Information Systems*, Summer 2005, (9)3.
- McKell, L. J., J. H. Reynolds, H. E. Longenecker, Jr., and J. P. Landry (2003) "Aligning ICCP Certification with the IS2002 Model Curriculum: A New International Standard," *International Business & Economics Research Journal*, September 2003, (2)9, pp. 87-91.
- McKell, L.J. (moderator) (2001) "Individual Certification: A Complement to Program Accreditation." Panel discussion, Information Systems Educators Conference (ISECON) sponsored by the AITP Education Special Interest Group and the AITP Education Foundation, Cincinnati, Nov. 2001.
- Pardue, J. H., J. P. Landry, H. E. Longenecker, Jr., and McKell, L. (2006) "Computing Program Curriculum Assessment: The Emergence of a Community of Practice," *Special Issue of Journal of Informatics Education Research*, Spring 2006, Volume 8, Number 2, pp. 105-119.
- Reynolds, J. H., H. E. Longenecker, Jr., J. P. Landry, J. H. Pardue, B. Applegate (2004) "Information Systems National Assessment Update: The Results of a Beta Test of a New Information Systems Exit Exam Based on the IS 2002 Model Curriculum," *Information Systems Education Journal*, May 1, 2004, Vol. 2, Issue Number 24, URL: <http://isedj.org/2/24/>
- White, Bruce., H. E. Longenecker, Jr., P. M. Leidig, and D. M. Yarbrough (2003) "Applicability of CMMI to the IS Curriculum: A Panel Discussion," *Proceedings of the Information Systems Education Conference (ISECON)*, November 2003, San Diego, CA.

LIST OF ACRONYMS

AACSB	Association for Accreditation of Collegiate Schools of Business
ABET	Accreditation Board for Engineering and Technology
ACM	Association for Computing Machinery
ACP	Associate Computing Professional
AITP	Association of Information Technology Professionals
CCER	Center for Computing Education Research
CCP	Certified Computing Professional
CoP	Community of Practice
DPMA	Data Processing Management Association
ICCP	Institute for Certification of Computing Professionals
ICCP/EF	Institute for the Certification of Computing Professionals / Education Foundation
IS 2002	Information Systems 2002 Model Curriculum
IS Exit Exam	Information Systems 2002 Exit Exam
ISA	Information Systems Analyst Certification
ISECON	Information Systems Education Conference
LU	learning unit
NCC	National Collegiate Conference

ABOUT THE AUTHORS

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